

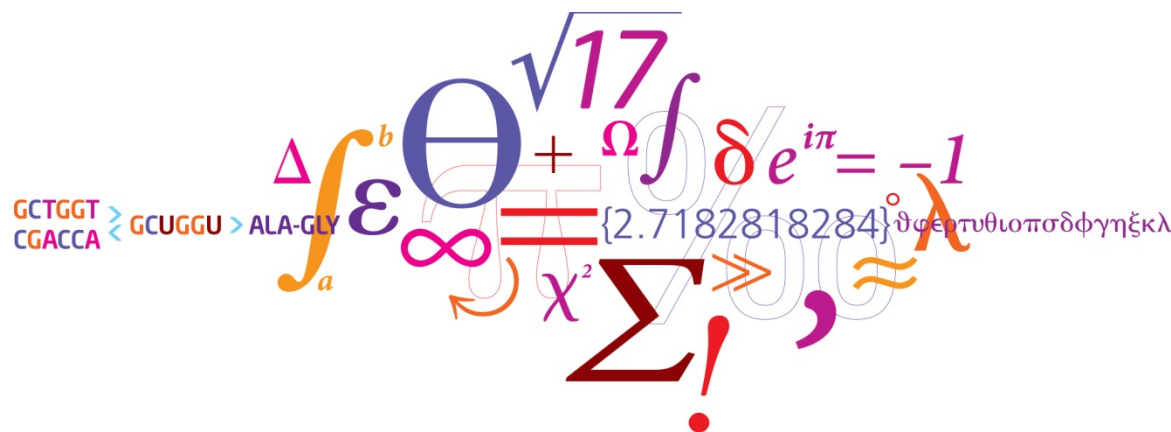
Introduction to Exercise 3

Biofilm development and conjugative pili

Experimental Molecular Medical Microbiology (27254)

Vinoth Wigneswaran

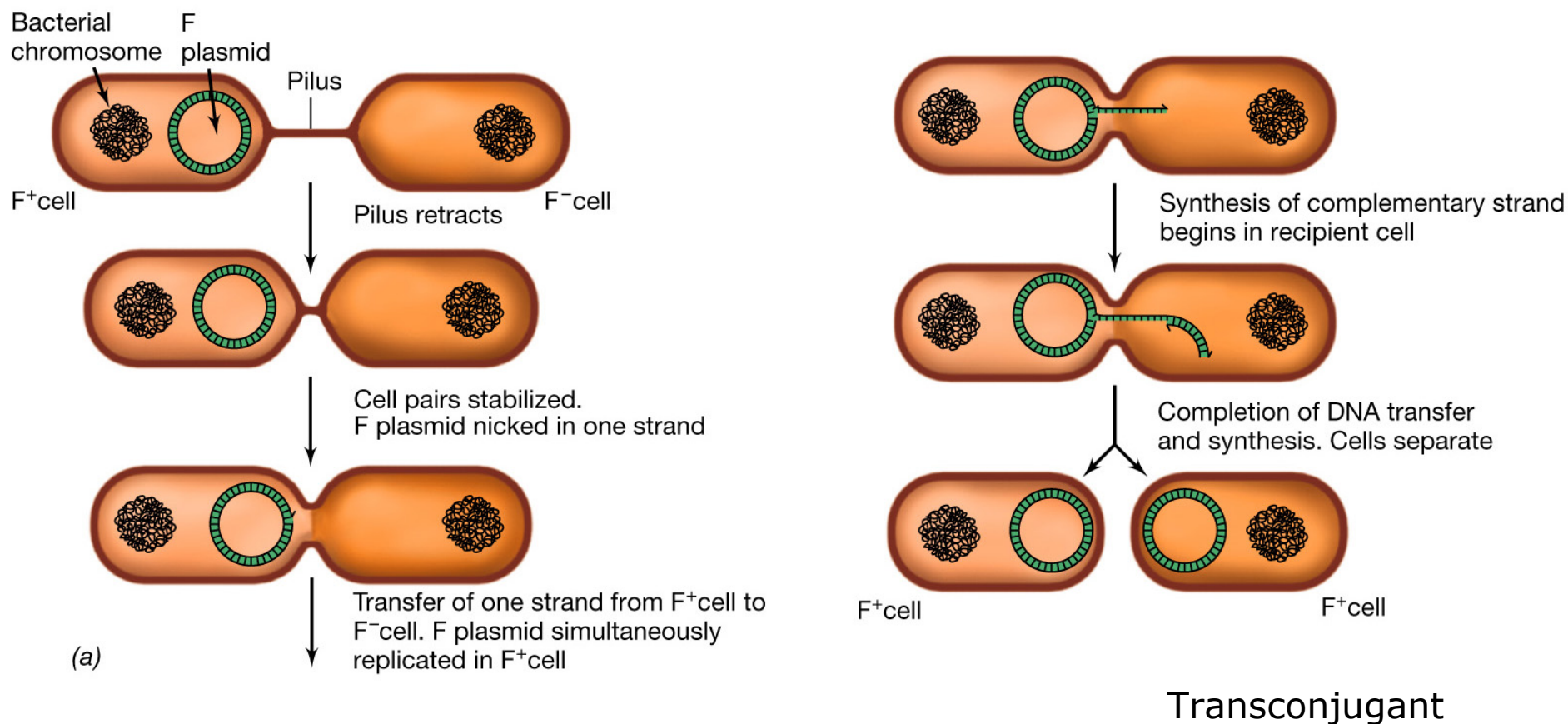
PhD student



Background

- Transferred information is often beneficial for the recipient
 - Spread of virulence factors
 - Antibiotic resistance genes
- Mechanisms of genetic exchange
 - Transduction
 - Transformation
 - Conjugation

Plasmid transfer by conjugation

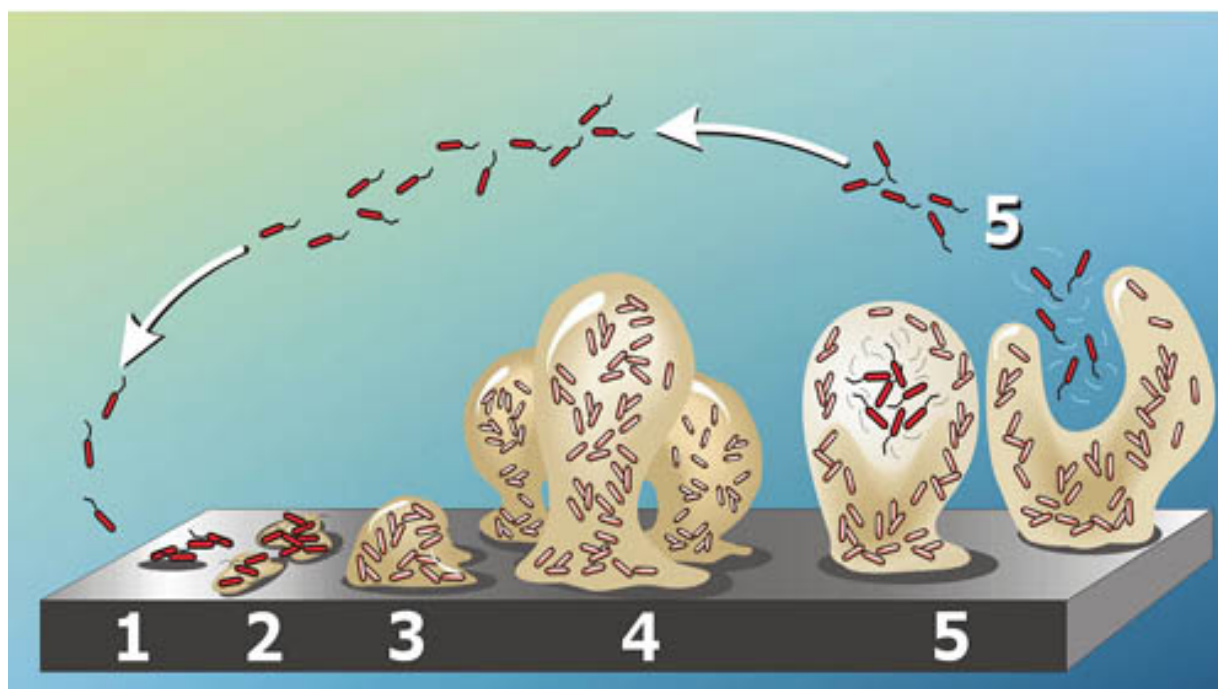


incF plasmid properties

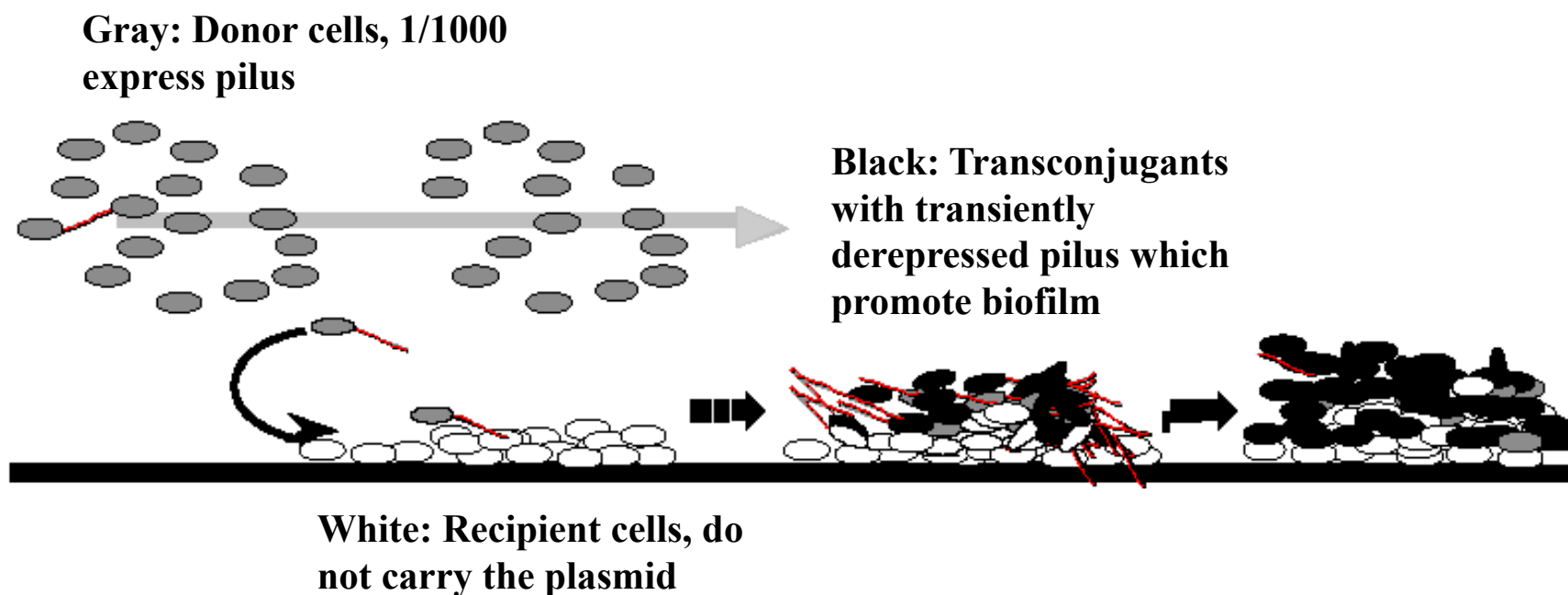
- The genes required for conjugative transfer are present on the plasmid (*tra* genes)
- *tra* genes encode a pilus to mediate cell-cell contact which promotes conjugation
- The cells carrying the plasmid are not subjected to another conjugation (incompatibility)
- Only 1 out of 1000 cells carrying the naturally repressed plasmid express a functional pilus
- Mutation in the *finO* gene disrupts the repression mechanism and leads to a constitutive expression of pili, e.g. [R1*drd19*]
- The plasmid is transiently derepressed in newly formed transconjugants, which allows a rapid spread of the plasmid through populations

Biofilm formation

- Biofilm consist of microbial cells embedded in a self-produced matrix of extracellular polymeric substances
- The biofilm renders the microbial cells resistant to several antibiotics
- The structure of a mature biofilm varies depending on its location, the nature of the constituent organisms, nutrients etc.



Biofilm formation



Objectives

- Investigate if the expression of conjugative pili promotes biofilm formation of *E. coli*
- Investigate the influence of additional factors on biofilm formation
- *In situ* investigation of plasmid transfer

Four subexercises

- 3A: Construction of test strains for 3B
- 3B: Biofilm formation in microtiter plates
- 3C: Biofilm formation in flow chambers
- 3D: Visualization of plasmid transfer